

a controller for controlling the supply of the source gas, the etching gas, and the purge gas and opening and closing of the shutter.

2. (Amended) The layer-by-layer etching apparatus of claim 1, wherein the neutral beam generator comprises:

an ion source for extracting an ion beam having a predetermined polarity from the source gas and accelerating the ion beam; and

a reflector positioned in a path of the ion beam accelerated from the ion source, for reflecting and neutralizing the ion beam.

3. (Amended) The layer-by-layer etching apparatus of claim 2, wherein the reflector has a plate shape.

4. (Amended) The layer-by-layer etching apparatus of claim 2, wherein the reflector comprises a plurality of co-centric cylindrical reflecting members and different polar voltages are applied to adjacent reflecting members.

7. (Amended) The layer-by-layer etching apparatus of claim 1, wherein the substrate to be etched contains silicon.

8. (Amended) A layer-by-layer etching method using a neutral beam, comprising:

(a) loading a substrate to be etched, on which a layer to be etched is exposed, on a stage in a reaction chamber;

(b) supplying an etching gas into the reaction chamber to adsorb the etching gas on a surface of an exposed portion of the layer to be etched; and

(c) irradiating a neutral beam on the layer to be etched on which the etching gas is adsorbed

9. (Amended) The layer-by-layer etching method of claim 8, wherein steps (b) and (c) form one cycle which is repeatedly performed to etch the layer to be etched from the surface of the layer in a layer-by-layer manner.

A2  
Concluded  
Sub B17  
10. (Amended) The layer-by-layer etching method of claim 9, wherein a monoatomic layer distributed on the surface of the layer to be etched is etched by half whenever the cycle is performed one time.

11. (Amended) The layer-by-layer etching method of claim 8, wherein in step (c) acceleration energy of the neutral beam is controlled so that sputtering does not occur on the surface of the layer to be etched.

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12. (Amended) The layer-by-layer etching method of claim 8, further comprising removing excessive etching gas remaining before the step (c).

13. (Amended) The layer-by-layer etching method of claim 8, wherein in step (c), the neutral beam is irradiated from an ion source for extracting an ion beam having a predetermined polarity from a source gas and accelerating the ion beam and a neutral beam generator having a reflector which is positioned in a path of the ion beam accelerated from the ion source and reflects and neutralizes the ion beam.

Please insert the following newly added claims 16-21.

14. (Newly Added) The layer-by-layer etching apparatus of claim 3, wherein the reflector is tiltable to control an angle of incidence of the ion beam which is incident thereto.

A4  
Sub B17  
15. (Newly Added) The layer-by-layer etching apparatus of claim 1, wherein the neutral beam is an argon neutral beam.

18. (Newly Added) The layer-by-layer etching apparatus of claim 1, wherein the etching gas comprises a chlorine gas.

19. (Newly Added) The layer-by-layer etching method of claim 8, further comprising removing etch by-products generated by the irradiation of the neutral beam after the step (c).

20. (Newly Added) The layer-by-layer etching method of claim 14, wherein the removing excessive etching gas comprises supplying a nitrogen gas as a purge gas to the reaction chamber.

21. (Newly Added) The layer-by-layer etching method of claim 19, wherein the removing etch by-products comprises supplying a nitrogen gas as a purge gas to the reaction chamber.

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